Lower Passaic River Interim Remedy FS: CPG Presentation to CSTAG/NRRB

November 20, 2019

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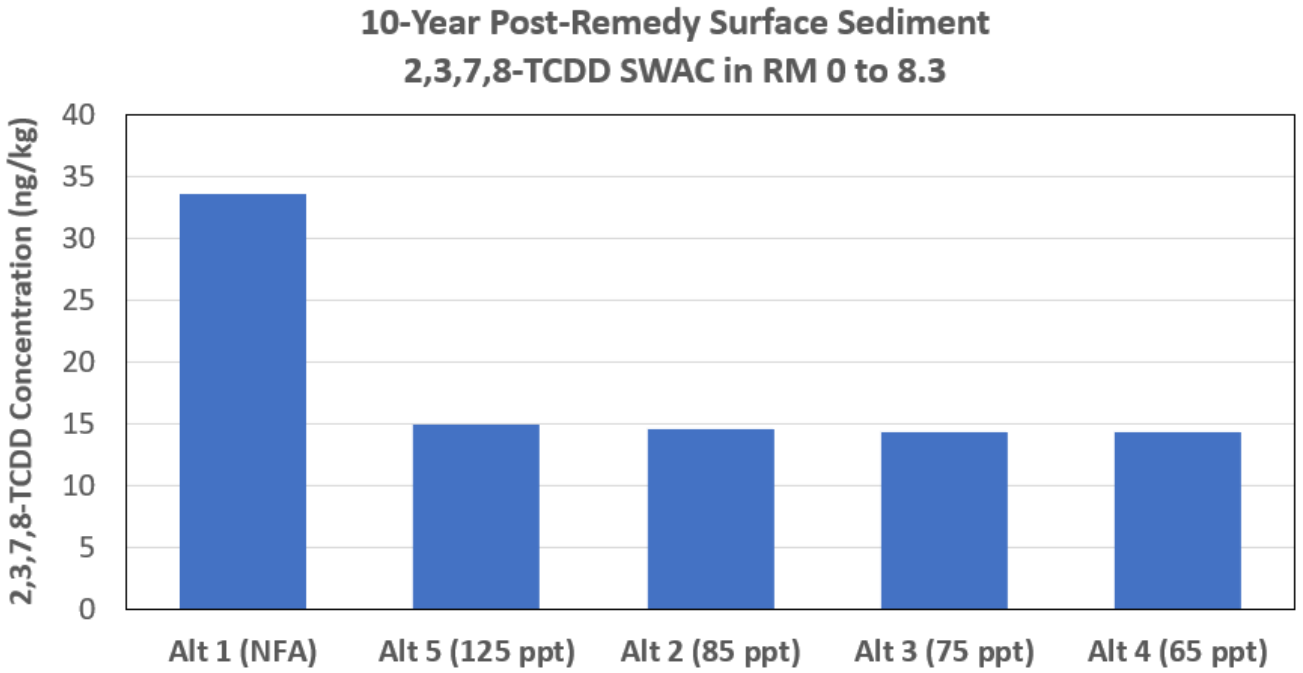
Why an Interim Remedy?

- Align with remediation in the lower 8 miles
  - Maximize efficiency while minimizing community impacts
  - Accelerate risk reduction and recovery for the entire LPR
  - Minimize recontamination in lower 8 miles

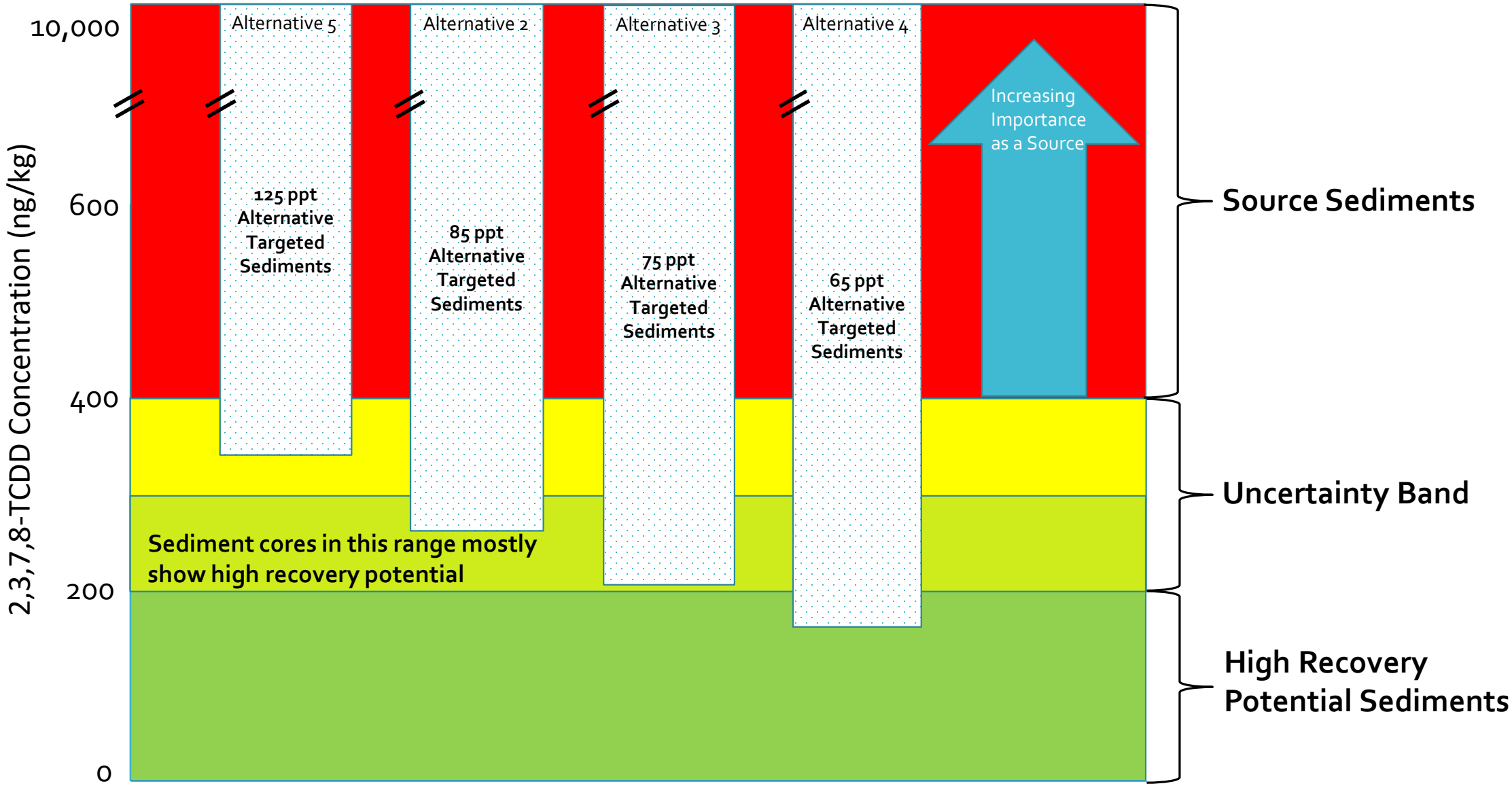


- Why interim?
  - Data gaps identified in the RI warrant delay in choosing a final remedy
  - Data collected for the interim remedy and associated adaptive management will lead to a final remedy

Source Control is the Objective of the Interim Remedy

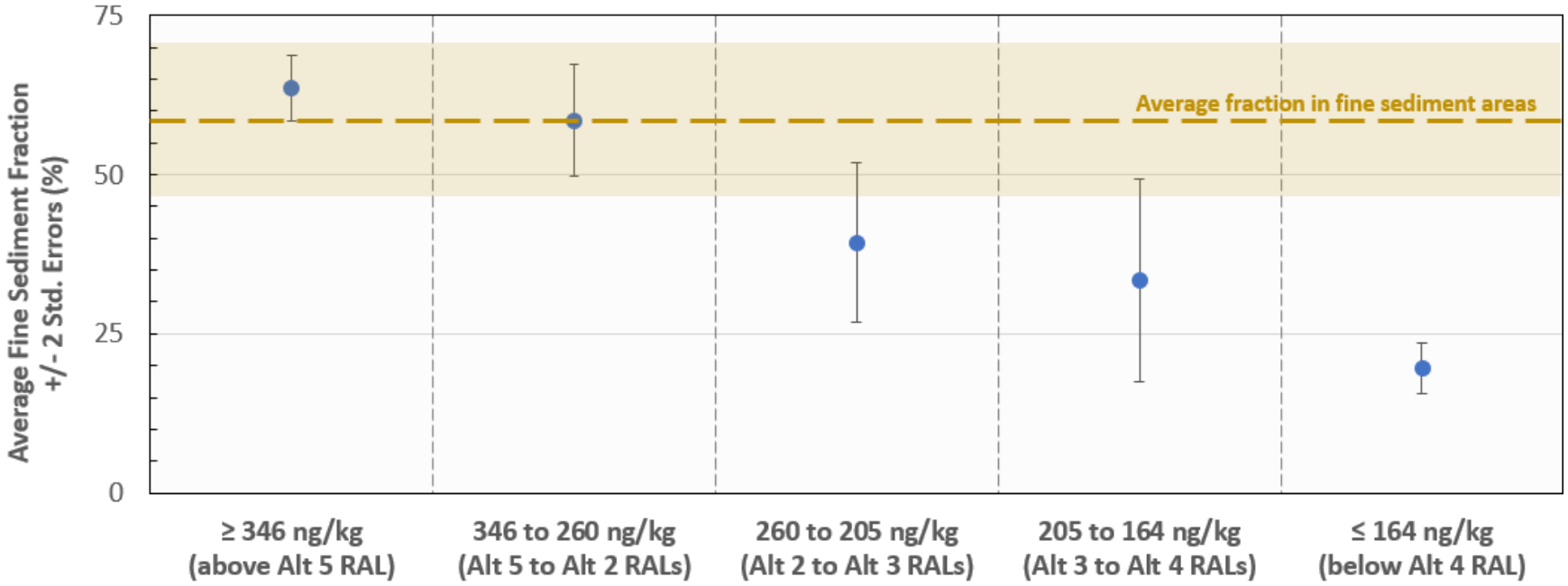
- Remediate
  - Higher concentration sediments responsible for the slow rate of recovery (RAO 1)
  - Erosional areas with risk of buried high concentration sediments being exposed (RAO2)
- Reduce the source
  - Chemical flux from sediments to the water column
- Reduced flux results in lower concentrations on particles depositing on the sediments
- This reduction accelerates recovery
  - Surface sediment concentrations drop as they accumulate the lower concentration solids
  - Drop further reduces concentrations on depositing particles, setting up a feedback loop that fuels additional recovery

Remedial Alternatives Considered for Source Control



RALs established using the base mapping in the FS (Conditional Simulation Map 37)

Larger Alternatives Extend Targeting to Coarser Sediments Not Likely to be Significant Sources



SWAC Goals of Alternatives 2, 3 & 4 are More Than 90% Below Current TCDD SWAC

Alternative	SWAC Goal (ng/kg)	Percent Reduction from Current SWAC of 990 ng/kg
2	85	91
3	75	92
4	65	93
5	125	87

FS report shows slightly greater reductions because additional remediation to address RAO 2 drives SWAC below the goal.

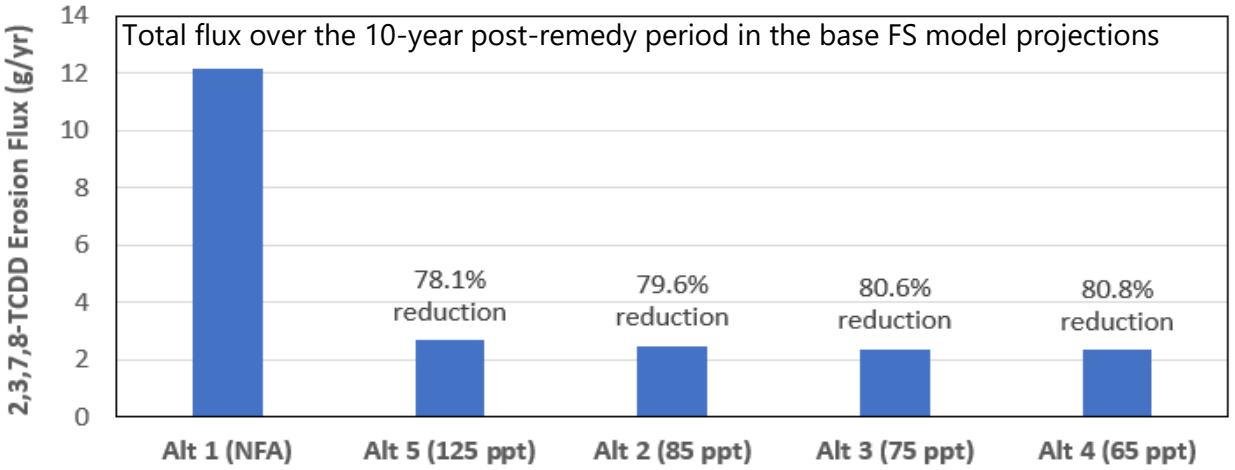
Modeling of 2,3,7,8-TCDD Used to Assess Source Control Over the 10-Year Post-Remedy Period

- Gross erosion flux from sediments
- Average concentration on depositing fine sediment
- Recovery rate
- Average water column concentrations
- Average net flux from upper 9 miles to lower 8 miles

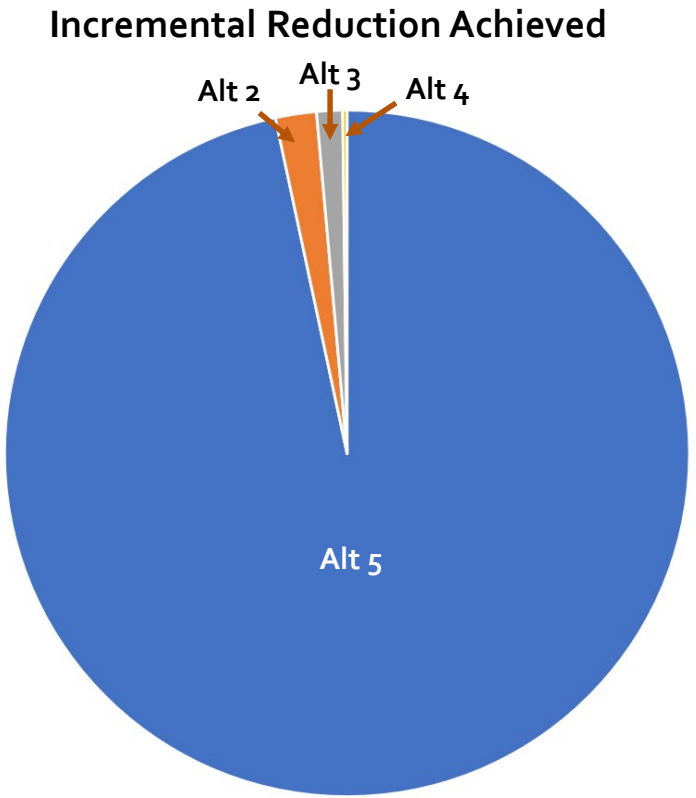
The modeling is subject to considerable uncertainty and results are used for comparative purposes only. USEPA, NJDEP and the CPG have agreed to not rely on point concentrations

Alternative 5 Reduces Gross Erosion of 2,3,7,8-TCDD by 78%

Little Additional Reduction With Larger Remedies

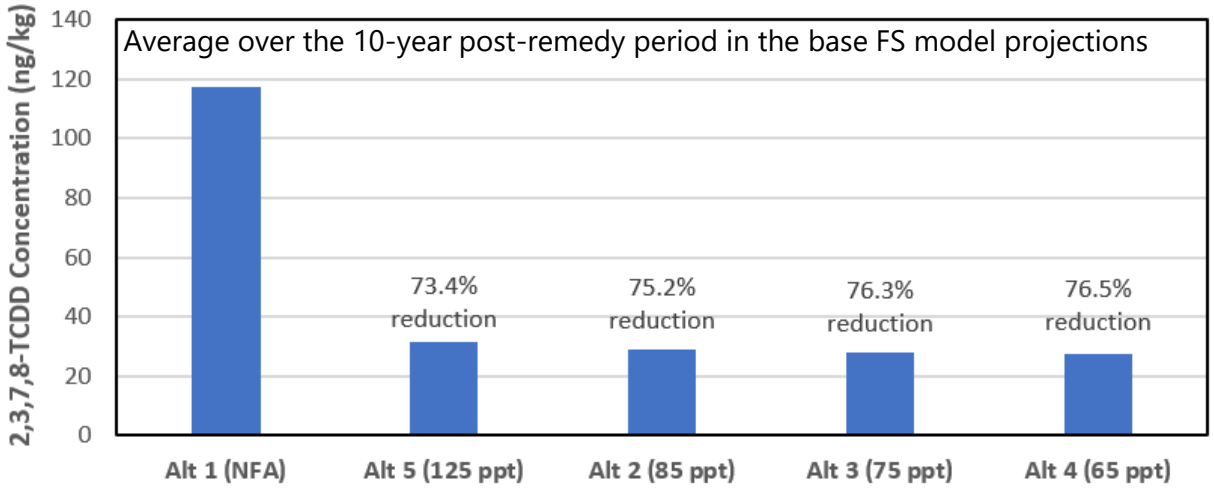


Alt 2 achieves 99% of the reduction attained across all active alternatives



Alternative 5 Reduces 2,3,7,8-TCDD on Depositing Fine Sediment by 73%

Little Additional Reduction With Larger Remedies



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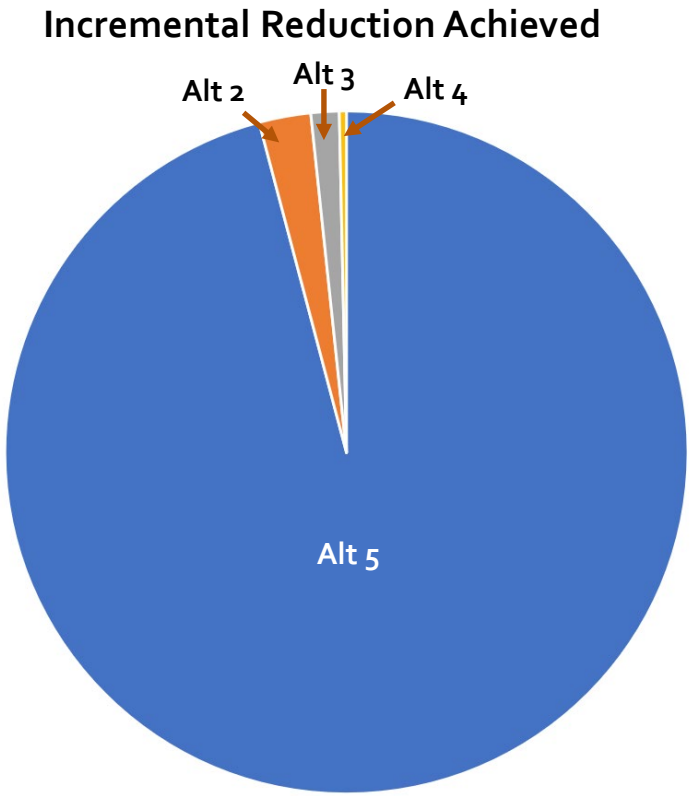
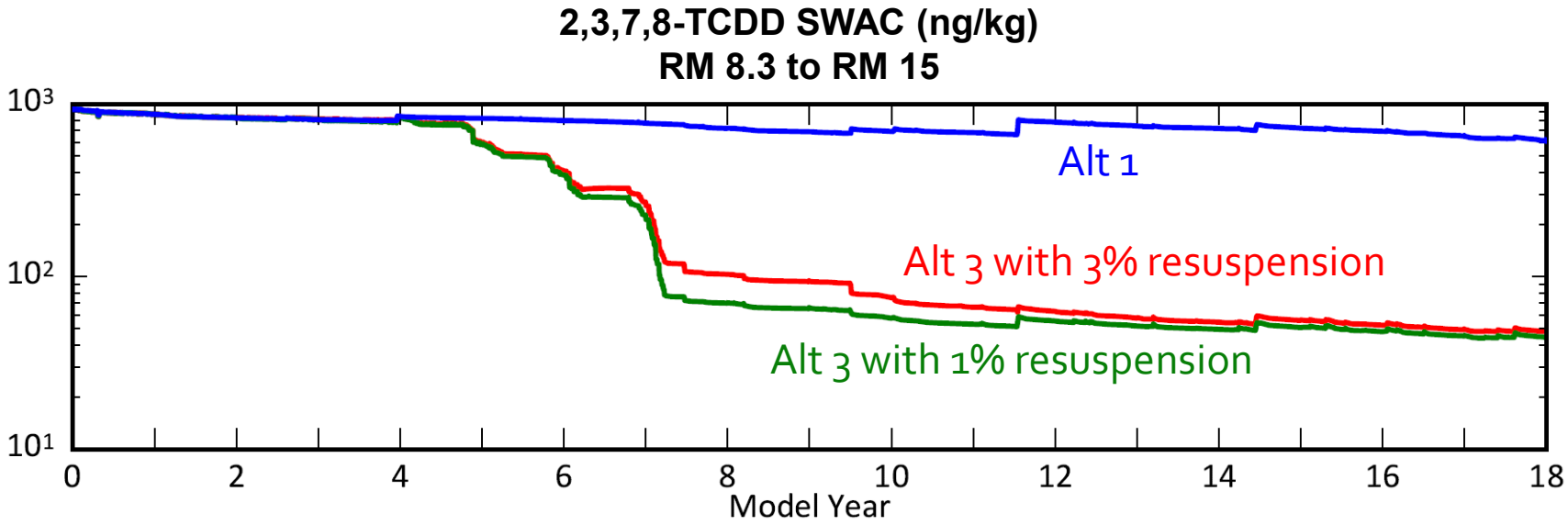


Remediation Accelerates Recovery But Rates Vary With Model Set Up



	Half-time (years) Based on Year 8 to 18
Alt 1 (NFA; remediation in lower 8 miles only)	43
Alt 3 (75 ppt, Remedy ST run) with 3% dredge resuspension	9
Alt 3 (75 ppt; Remedy ST run) with 1% dredge resuspension	14

Projected rates of recovery are sensitive to how model is set up, assumed dredge resuspension, targeting error of procedures used to delineate active remediation, and overall model uncertainty. Endpoint concentrations converge as short-term resuspension effects fade. Half-time estimates assume first order decay.

Comparing Across Alternatives, 2, 3 and 4 Accelerate Recovery to a Similar Extent

Alternative	Post-Remedy Attainment Goal for 2,3,7,8-TCDD SWAC (ng/kg)	Model Predicted 2,3,7,8-TCDD RM 8.3 to RM 15 SWAC 10 years Post-Remedy (ng/kg)	Recovery Half-Time (yrs) if Design SWACs are Met at Remedy Completion
1	--	615	43
2	85	53	14
3	75	48	15
4	65	42	16

Note of Caution: ***Focus on relative comparisons not absolute values.*** The values reported here were developed using concentrations projected 10 years post remedy with remedy-specific sediment transport, 3% dredge resuspension, and assuming SWAC goals are attained at end of active remediation. Note that recovery is faster with remedy-specific sediment transport than without.

Conclusions Regarding Source Control

- Alternative 5 achieves nearly all the source control attained across all the alternatives
  - Alternative 5 is deficient in that it does not meet the RAO of a post-remedy SWAC of 85 ng/kg
- Alternative 2 meets the SWAC RAO and achieves 98-99% of the source control attained across all the alternatives
  - Meeting the SWAC RAO is a characteristic of Alternative 2 and a remedy with its specifications would be designed to achieve that objective
- Alternative 2 targets mainly fine sediments; larger alternatives add targeting of coarser sediments not likely significant sources
- Alternatives 2, 3 and 4 accelerate recovery to a similar extent

The CPG Concludes that Alternative 2 is the Preferred Alternative

- It achieves effective source control and reduces the TCDD SWAC by 91%
- It provides long-term effectiveness and permanence like the larger alternatives
- It ranks higher than the larger alternatives for short term effectiveness and implementability
- It is more cost-effective; the added costs of the larger alternatives effect minimal improvements in the source control of the Interim Remedy
- Post IR recovery is accelerated and recovery rates for Alternatives 2, 3, and 4 are essentially equivalent
- Post IR recovery will be monitored under adaptive management to identify a final remedy

RAO 1 Should Be Modified to Express the SWAC Goal in Terms of a RAL

- Substantial technical issues exist with post-remedy SWAC as a measurable objective on which USEPA can certify Remedial Action Project Completion
- USEPA's most recent analysis found that even if 2,400 locations were sampled (an unprecedented density), the uncertainty of the estimated SWAC would still be large
  - Five percent chance the Upper Confidence Limit of a SWAC estimate would be as high as 128 ng/kg when the true SWAC is 85 ng/kg
- In design, a RAL will be established to achieve the SWAC goal
- Post-remedy sampling can more confidently evaluate if actionable sediments above a RAL were missed than whether a SWAC goal was achieved